

A large, stylized, light blue and white graphic of a bird in flight, possibly a seagull, is positioned in the upper left corner of the slide. The bird is facing right, with its wings spread. The background of the slide is a light blue gradient with subtle, wavy patterns.

Integrating NOAA Resources into your Environmental Education Program

Bronwen Rice
NOAA Office of Education

Outline

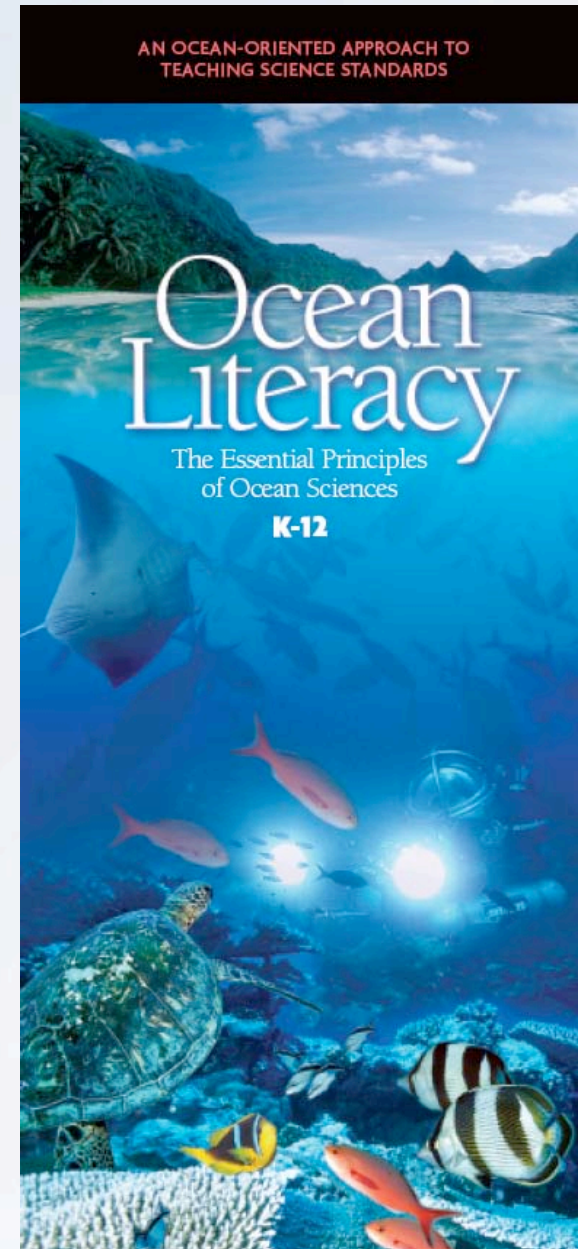
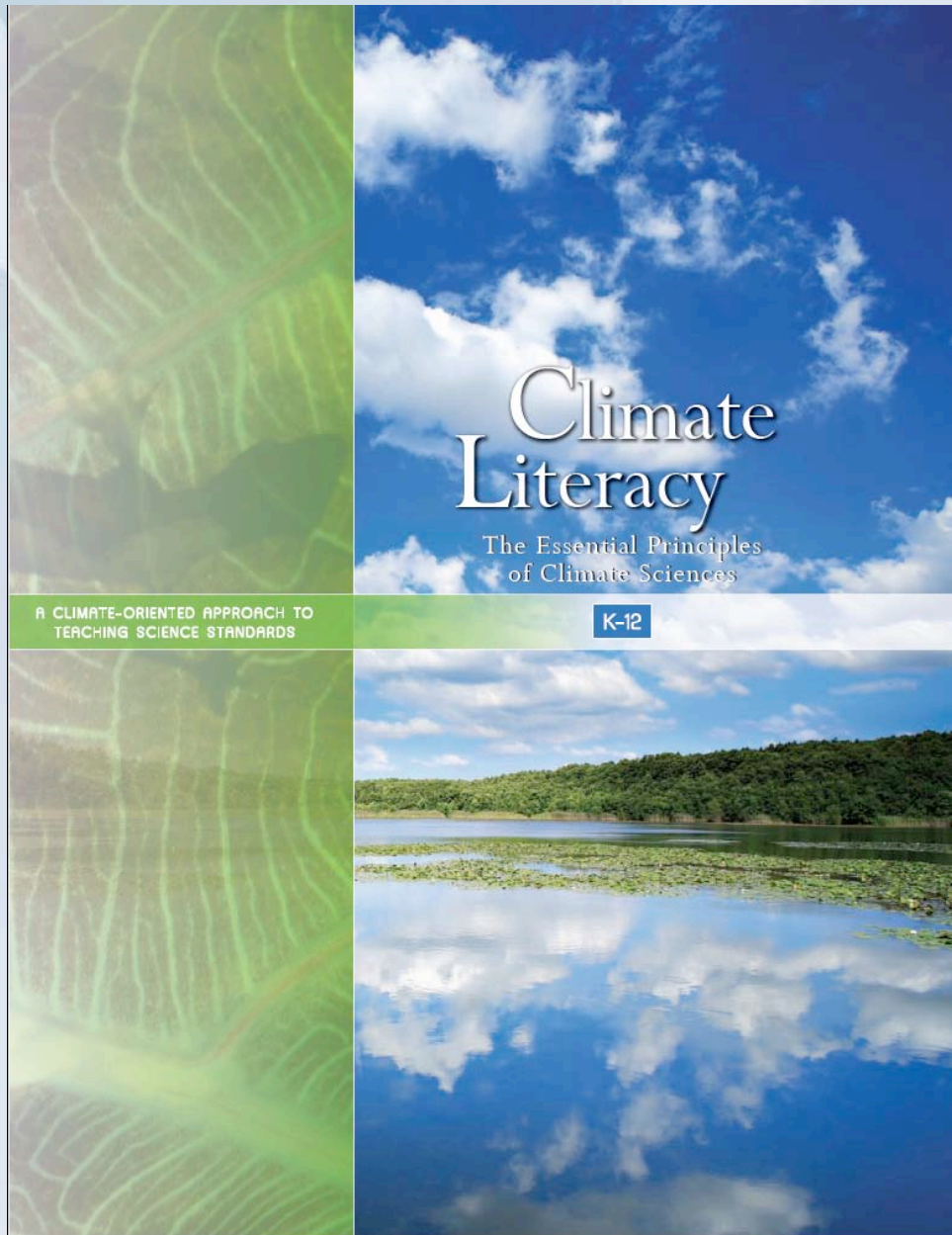
- Introduction to NOAA Education
- Overview of Some Available Resources
- Data in the Classroom: Focus on the NODE Program

What does NOAA offer Teachers?

- Real-time data
- Underwater photos and video – Live!
- Access to current research
- Places near your communities to visit: NERRS/Sanctuaries

**Lesson Plans and Curricula
that integrate these!**





Ocean Explorer

www.oceanexplorer.noaa.gov

- Educational materials based on expeditions
- Interactive live broadcasts from research cruises

<http://www.learningdemo.com/noaa/>

The screenshot shows the 'ocean explorer' website header with a navigation bar containing links: EXPLORATIONS, GALLERY, TECHNOLOGY, HISTORY, LIBRARY, EDUCATION, FOR FUN, and a search box. Below the header, the 'Explorations | Operation Laser Line 2006' section is displayed. On the left, a vertical sidebar lists various topics with corresponding icons: Mission Plan, Education, Black Coral, Bottom Fish, Technology, Explorers, and Information. The main content area features the title 'Operation Laser Line 2006' and the dates 'November 8 - 13, 2006'. A large image shows a research vessel at sea. To the right of the image, a text block explains the Laser Line Scan (LLS) technology. Below the text, a smaller image shows a close-up of the LLS system. On the far right, there are links for 'Mission Summary' and 'Photo and Video Log'.

Operation Laser Line 2006

November 8 - 13, 2006

Mapping of coral reefs has been identified as one of the first and most important steps needed to address the increasing decline of the world's coral reefs. Photography or direct observation is required to identify corals and other coral reef community organisms, but only small areas can be covered with these techniques. Laser line scanning has been suggested as an alternative method that can provide high-resolution imagery of the seafloor over a much wider area than conventional photography. Laser line scan (LLS) systems sweep a blue-green laser across the bottom and uses the reflected light to generate a gray-scale image of the seafloor that is similar to a black and white photograph.

The NOAA Pacific Island Fisheries Science Center, in collaboration with partners from the NOAA Office of Ocean Exploration, the Hawaii Undersea Research Laboratory, the Hawaii Division of Aquatic Resources and the UH Botany Department will embark on a 6-day research cruise from November 8 - 13, 2006. The only commercially-available LLS system in the world will be deployed at a handful of sites off the coast of Maui. Expedition survey targets include beds of commercially-harvested black coral, a recently-discovered deep hard coral reef, an important nursery area and fishing site for commercially-harvested groundfish, deep algae beds, and a WWII aircraft wreck. This wide range of targets will enable us to obtain high-resolution, high-resolution, and high-resolution data.

The screenshot shows the 'Ocean Currents' interactive lesson page. The page has a header with 'Ocean Currents' and 'Credits' and 'Printable version' links. Below the header, there are two tabs: 'Lesson' and 'Global Impact'. The main content area features a large image of ocean currents with arrows indicating flow direction. Below the image, there is a 'Play' button and a 'Pause' button. On the right side, there are three sections: 'Explore' with a 'Control Effect' link, 'Activities' with a 'CI M1a' link, and 'Camera and Marine Life' with a 'Life' link. At the bottom, there is a copyright notice: 'Copyright © 2008, National Media'.

Ocean Currents

Lesson Global Impact

Play Pause

Copyright © 2008, National Media

NERRS

www.nerrs.noaa.gov/Education/K12Educators.html



- Home
- NERRS News
- Background
- Designation
- Reserves
- Education
- Research
- Stewardship
- CICEET
- Fellowships
- Monitoring
- IOOS
- Training
- Volunteer
- Restoration
- Invasives
- Related Links
- Contact Us

K-12 Educators



Welcome to our new site developed specifically for educators working at the K-12 grade levels! The National Estuarine Research Reserve System (NERRS) comprises 27 reserves, and is a great resource for all things related to estuarine ecology, represents different biogeographic States that are protected for long water-quality monitoring, education stewardship. We invite you to learn

network, the dynamic on-site educational programs offered by each to increase estuarine literacy.

Check the resources we offer for education and let us know how we are in the process of developing this website and welcome all your

Distance Learning Programs: Check out these great links! Join us for a program in September 2006, and have your students ask questions! Use the Estuaries Tutorial to help you teach about estuaries!

Curriculum Materials: This is a collection of curricula, lesson plans, point presentations that have been developed by some of the National Estuarine Research Reserves. These materials can help you introduce your students to estuarine topics and environments.



- Offer classroom materials and *EstuaryLive!* A field trip over the internet

Elkhorn Slough NERR: www.elkhornslough.org

Sanctuaries

<http://sanctuaries.noaa.gov/education/welcome.html>



- Downloadable lesson plans
- Encyclopedia of the Sanctuaries (under Photos tab)
- *OceansLive* Portal

Sanctuaries

<http://oceanslive.org/portal/>



- Downloadable lesson plans
- Encyclopedia of the Sanctuaries (under Photos tab)
- *OceansLive* Portal

National Ocean Service (NOS)

<http://oceanservice.noaa.gov/education/welcome.html>

noaa ocean service education

Edu Home Students Teachers For Fun NOS Home

NOAA's Ocean Service Education

NAUTICAL CHARTS:
MESSAGE IN A BOTTLE!

Students

Grade 3-5: Mystery Grades 6-12: Tutorials Case Studies

[Nautical Charts](#) [Corals](#) [Prince William's Oily Mess](#)

[Sea Floor Mapping](#) [Currents](#) [The Lionfish Invasion](#)

[Estuaries](#)

[Geodesy](#)

[Pollution](#)

[Tides](#)

EDU ACTION

- Connecting with Climate Change Educator Conference July 23-24, 2008
[Details](#)
- New** - Message in a Bottle:
[Nautical Charts Mystery for Grades 3-5](#)
- New** - Coastal America Art Contest for grades K-12:
[Details](#)

- Discovery Kits
- Interactive nautical chart lesson
- Web seminars (with NSTA)

National Ocean Service (NOS)

<http://oceanservice.noaa.gov/education/welcome.html>

Estuaries Game!

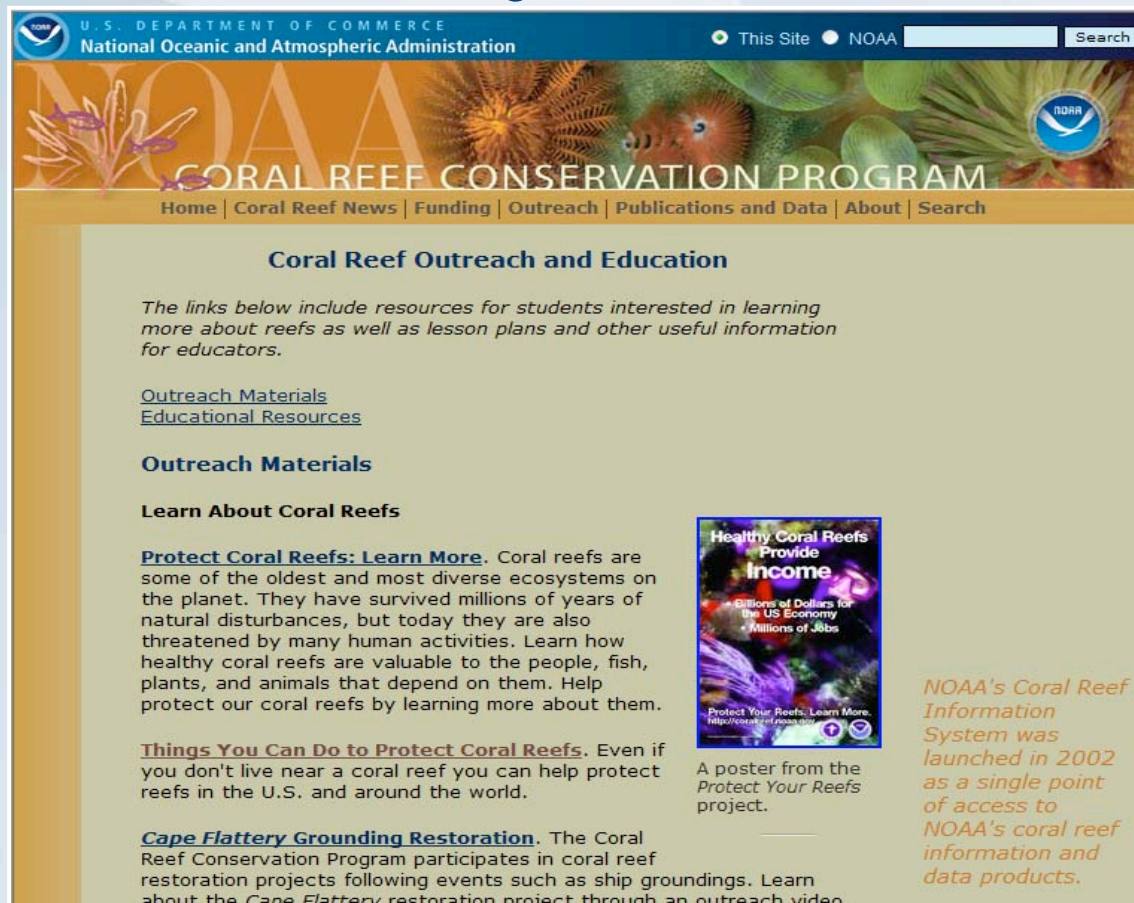


May 17, 2008

California B-WET Local Conference

Coral Reef Conservation Program

www.coralreef.noaa.gov/outreach/welcome.html



- NOAA's Coral Reef Information System (CoRIS), a single point of access to NOAA coral reef information and data products
- Coral Reef Discovery Kits

National Weather Service: JetStream

National Weather Service
JetStream - Online School for Weather

JetStream Home NWS Home Weather forecast by "City, St" or zip code City, St

Jetstream Topics

1. Why JetStream?
2. The Atmosphere
3. The Ocean
4. Global Weather
5. Synoptic Meteorology
6. Thunderstorms
7. Lightning
8. Tropical Weather
9. Doppler Radar
10. Remote Sensing
11. Weather on the Web
12. The National Weather Service
13. Appendix

Additional Info:
Lesson Plan Overview
Topic Matrix
JetStream News



The Chaiten Volcano in Chile erupted on Friday, May 2, 2008. This image, captured May 3, shows the enormous ash plume rising high over the Andes mountains, drifting across Argentina, and dissipates over the Atlantic Ocean. Ash closed schools, roads, and an airport in Argentina, hundreds of kilometers away from the volcano, said AFP.

On Tuesday, May 6, 2008, the volcano erupted again, spewing pyroclastic materials like hot ash, gas and rocks 19 miles into the air. This image was captured that same day by the MODIS on the Terra satellite, during its morning overpass. The resulting plume from the volcano was again visible over Argentina, stretching to the ocean.

Credit: Jeff Schmaltz, MODIS Land Rapid Response Team, NASA GSFC [Click to enlarge](#). (1 mb)

<http://www.srh.noaa.gov/jetstream/>

- Lesson plans and tutorials on various weather topics
- New Cloud Chart
- NOAA Weather Radio



NOAA Data Education Project (NODE)

- A pilot K-12 education project coordinated by Sanctuaries, Estuarine Research Reserves, and NODC
- Three multi-level curriculum modules focused on middle school, grades 5-8
- Web browser-based with student materials available in a downloadable format for printing.
- Accompanied by IOOS data interface, interactive web activities, data visualizations and animations
- Currently undergoing teacher evaluation



NODE: Emphasis on Context & Relevance

- Data sets are *not* presented as stand alone data exploration interfaces
- Presents data through real world issues
- Utilizes the scientific story told by the data to provide context
- Students are using real data and real science
- Correlated to the National Science Standards & National Math Standards

<http://www.dataintheclassroom.org/>

Data in the Classroom	Investigating El Niño Using Real Data	
Level 1	El Niño	Links
Level 2	<i>People blame El Niño for all kinds of abnormal weather. But how does El Niño really work?</i>	<ul style="list-style-type: none">• NOAA El Nino page• The Integrated Ocean Observing System (IOOS)• Science and the Sea: El Niño
Level 3	This Web site features five activities at different levels to help you learn about El Niño using real data.	
Level 4	Teachers: start here to download the curriculum guide.	
Level 5		
Get Data		
Teachers		
Survey		



Level 1

Level 2

Level 3

Level 4

Level 5

Get Data

Teachers

Survey

Problems?

[Contact us](#)

[El Niño](#) ▶ Get Data

Which data?

Sea surface temperature ▼

[About the data](#) ↗

Which view?



☒ Map (latitude and longitude)



☐ Graph along a line of latitude

Specify a date.

16 ▼ Dec ▼ 1997 ▼

Select an output format.



Image

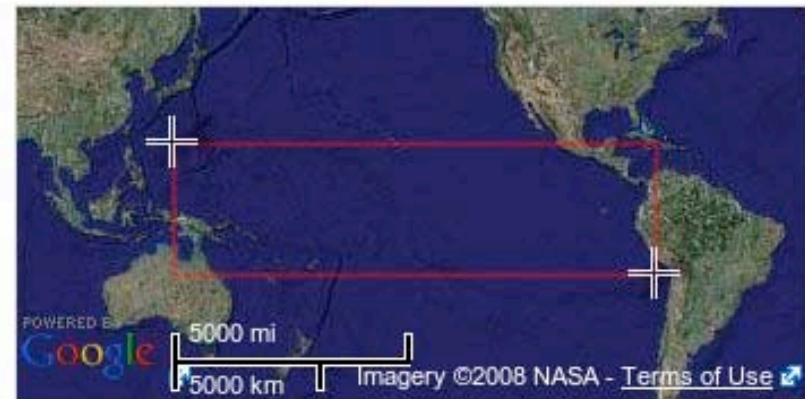


Data file for spreadsheet

Get Data

Select a region.

Click and drag the crosshairs on the map to select the region you wish to display. You may also enter latitude and longitude values directly in the boxes provided.

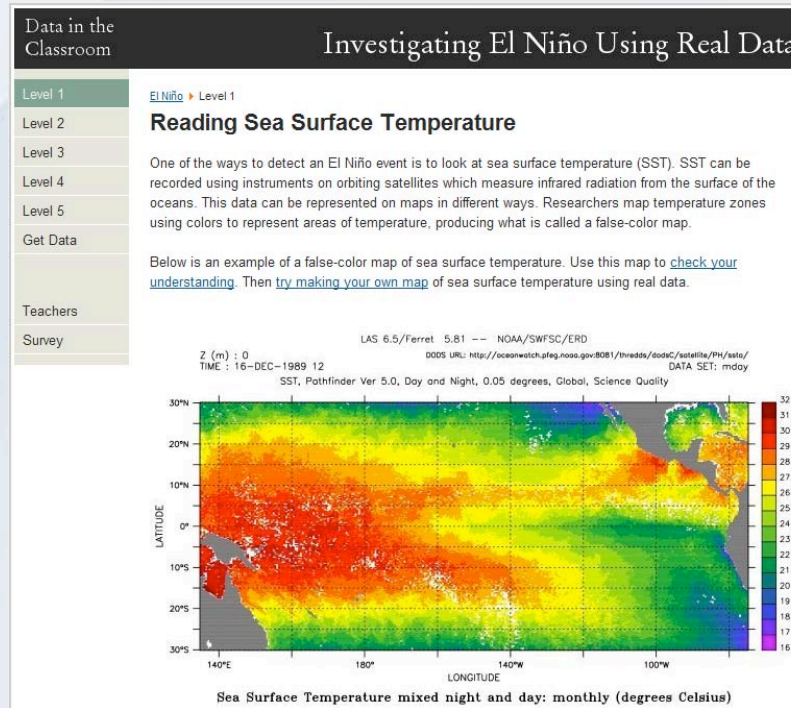


135 E ▼ 20 N ▼ 75 W ▼ 20 S ▼

[Get help using this form.](#)

NODE: El Niño

Levels of Scaled Interaction



Increasing # of data sets & depth of
exploration

5 Invention: Highest cognitive level. Student driven, full inquiry style

4 Interactivity: Students analyze data and discuss findings using problem solving techniques and technology driven tools

3 Adaptation: Students use portal tools to play and practice what they know.

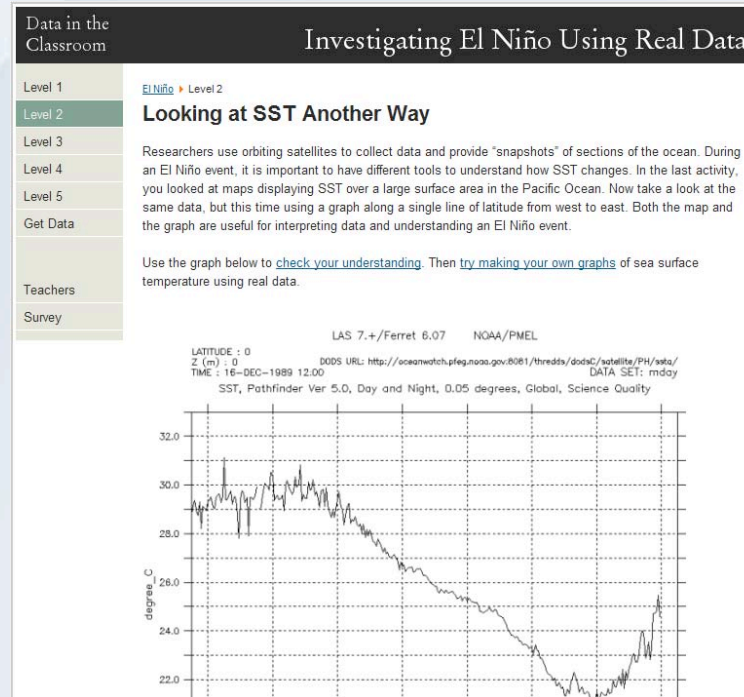
2 Adoption: Students use drill and practice using online tools to gather data.

1 Entry: Students look at research questions and discover data that helps them understand key principles & concepts.

**Builds
Data
Literacy**

NODE: El Niño

Levels of Scaled Interaction



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Literacy**

NODE: El Niño

Levels of Scaled Interaction

Increasing # of data sets & depth of
exploration

Data in the
Classroom

Investigating El Niño Using Real Data

Level 1
Level 2
Level 3
Level 4
Level 5
Get Data
Teachers
Survey

[El Niño](#) ▶ Level 3

Check your understanding

Select three images below that might indicate an El Niño event.

5 Invention: Highest cognitive level. Student driven, full inquiry style

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Data in the Classroom

Investigating El Niño Using Real Data

Level 1
 Level 2
 Level 3
Level 4
 Level 5
 Get Data
 Teachers
 Survey

El Niño ▶ Level 4
Relating SST to Productivity
 Phytoplankton are microscopic plants that live near the surface of the ocean and provide food for larger organisms. They form the base of the food chain. Nutrients carried by upwelling from deeper water up to sunlit surface water encourage phytoplankton growth. This process can be compared to the addition of fertilizers to soil to encourage land plants to grow faster and larger.
 Phytoplankton also contain chlorophyll, which enables them to use photosynthesis. Scientists estimate the amount of phytoplankton in the ocean by using data from satellites that can detect chlorophyll by color.
 During an El Niño, when upwelling is disrupted, scientists measure a decrease in chlorophyll in areas of the eastern Pacific. This signals a decline in phytoplankton productivity.
 Use the images below to [check your understanding](#). Then investigate the relationship between sea surface temperature and productivity for yourself by [making maps and graphs](#) of real data.
Set A
 Sea surface temperature
 Chlorophyll-a

Sea Surface Temperature mixed night and day: monthly (degree_C)
Log of Chlorophyll a monthly (mg m-3)

**Builds
Data
Literacy**

NODE: El Niño

Levels of Scaled Interaction

Data in the Classroom	Investigating El Niño Using Real Data
Level 1	El Niño ▶ Level 5
Level 2	Designing Your Own Investigation
Level 3	You have used real data to begin to understand the phenomenon of El Niño, but there is still a lot you can learn from exploring this data. El Niño events last an average of 12 to 18 months and occur about once every two to seven years. Ten events happened in the last 42 years, with one of the most extreme occurring in 1997-98.
Level 4	
Level 5	Using what you've learned, develop your own hypothesis about El Niño. Then see if you can get data to support or disprove it!
Get Data	
Teachers	
Survey	

Increasing # of data sets & depth of exploration

- 1 Entry:** Students look at research questions and discover data that helps them understand key principles & concepts.
- 2 Adoption:** Students use drill and practice using online tools to gather data.
- 3 Adaptation:** Students use portal tools to play and practice what they know.
- 4 Interactivity:** Students analyze data and discuss findings using problem solving techniques and technology driven tools
- 5 Invention:** Highest cognitive level. Student driven, full inquiry style

**Builds
Data
Literacy**

Opportunities for Participation

<http://www.dataintheclassroom.org/>

Data in the Classroom

AboutNODE ProjectDownloads

A+ A- R

Investigate Earth processes using real data:

- [El Niño](#)
- [Sea Level](#)
- Water Quality In development



• Sign up

Step 1

Teachers, if you are interested in helping us test the new curriculum modules for this project, please take a moment to [register and sign up](#).

• Use the curriculum

Step 2

Once you've registered, feel free to try any of the curriculum modules shown above. The [El Niño](#) and [Sea Level](#) modules are available now.

• Tell us what you think

Step 3

After using the curriculum, be sure to fill out an evaluation survey. You can earn continuing education credits through the University of Wisconsin.

[Privacy Policy](#) [Contact](#) [Site Map](#)

Thank You!

Contact Information:

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